

Still Alive With Sir Clive!

ZXir QLive Alive!

The Timex/Sinclair North American User Groups Newsletter

Volume 9 No. 2

Summer '99

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T/SNUG Information

We wish to support the following platforms: ZX 9801, TS-1000, Spectrums, TS-2060, Z88 and QL. If you have any questions about any of these fine Sinclair's, contact the:

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Any of the above can also be reached by E-Mail through the Club BBS 847 632-8858

ZXir QLive Alive!

Is the newsletter of T/SNUG, the Times/Sinclair North American User Groups, providing news and software support to the T/S community as a **VOLUME** of four newsletters per year, beginning with the Spring (March) 1998.

T/SNUG's main goal is to preserve and encourage the use of Sinclair computers by providing an open forum for the exchange of knowledge, building and maintaining of software libraries. Providing vendors, repair service and members with free ad space.

It is the user groups and individual subscribers, rather than the vendors, that provide the pecuniary support for the newsletter. Vendors and developers receive the newsletter free of charge, though contributions from vendors and user groups is gratefully accepted. Please support our vendors and service providers whenever possible.

If you have a problem or you have solved a problem, please share it with the rest of us. No problem will be considered anonymous.

Editor/Treasurer Publisher

If on one trip T/SNUG alone by no an annual contribution of \$12 for one VOLUME made payable to Abed Kahlale. Send check to:

ABED KAHALE
3343 S FLAT ROCK CT
SIERRA VISTA AZ 85550-0874
520 378-3424

Back copies are available for
\$1.00 each postpaid.

Treasury Notes

As of June 15, 1998, we have a balance of \$480.21

Article Contributions

Send in your articles by disk, hardcopy or mail, e-mail and your inputs to —

Abed Kahlale

E-mail: AKahlale@compuserve.com

WELCOME
Ellen Goodwin

GATOR's Twisted Pair

To better inform the Sinclair Community, three 24-hour a day BBS's are now provided to serve you. You are encouraged to exchange mail and use the files sections of these boards. Bulletin and ads are available to all.

Q-Box BBS 810 254-8878

Utica, Michigan

SQL BBS 520 882-0388

Tucson, Arizona

Club BBS 847 632-8858

Arlington Heights, Illinois

WebPages

<http://users.ari.clubbs/tanugi/>
<http://www.outlawnet.com/~josefnoel>

If you know the Internet E-Mail address of a Sinclair user, but do not have access to Internet, simply address your E-Mail to GATOR. Send us the 24-hour Club BBS and include the name and E-Mail address of the user you wish to reach. Then check the Club BBS from time to time if you expect a reply.

We encourage you to exchange mail and contribute to the UPLOAD section. Call and register using your first, last name and please number along with a password you won't forget. *Wear it Down!* Do not try to do anything else to this date.

When you call-in the next time, you will have Level 5 security and be able to upload files over protocols. The BBS has another section called *memberships* Section 1 for "Join a Community" Section "TRAFIC" to get into the Sinclair System. The mail you that mail will only be from other TS users. Use sections A&T for articles, ADS for ads and BBS for news when UPLOADING.

For help, contact the SYSDOP, Bob Swager, by leaving a message, mail, E-Mail or phone
CENUG108@juno.com

Input/Output

by Abid Kabala

Hallo Abid,

I was talking to Larry Kenney recently and he tells me that he is willing to release all his information on LaRken IDEs to the public domain. All he is asking for is a working Times/Sinclair 3000 and the last version of his T/S 3000 IDE in return. (It seems that both were "lost" during a move.) This is very kind to ask for this information and the possibility that a LaRken disk access could be built into one of the existing Sinclair emulators such as Garon Lancaster's Z80 emulator or the Wangyao emulator. (Much of my last T/S 3000 software is locked up on LaRken formatted diskettes as I still agree that one can not be accessed by any other means.)

Perhaps the best way for anyone who wishes to make an offer of either one would be to write Larry Kenney directly. His e-mail address is larken@attimes.ca. Just remind him what the offer is as well. There is also a LaRken Electronics web site.

Also, for the benefit of those who subscribe to ZQA but not to the list, you could put an announcement to this effect in the next publication.

David Selby

Hello Larry,

I just got a letter forwarded to me from T/S2000 by Abid Kabala from Darjeeling.

I am Bob Strager, —GATSB—, of GATOR Software Development - the author of LogCall for the LaRken Disk Interface on the T/S2000.

Next time you are surfing the INTERNET check out my homepage and capabilities! (to see my picture - adjust thing you'll ever see)

<http://members.aol.com/abidkaba/tswg> (where all North American Sinclair happens)

<http://members.aol.com/abidkaba/tswg> (our little Chicago Club)

Let me know what you think about our homepage —

—GATSB—

Hello Abid,

Program listings are best done in a fixed pitch (or mono spaced) font like OCR-A or Courier. This is especially true of QJ, BASIC and Pascal where the indentation is an indication of program flow which is useful for debugging.

People should also be encouraged to use a font as wide as 1 (one), does not look like a 1 (ell), or a 3 (three) does not look like an O (oh) and so on. It helps reduce the frustration levels of those who are trying to type in and run programs from listings.

I think, in the long run, this will also save you a lot of work as well as making ZQR QLive Alive a consistently high quality newsletter. (Sometimes the participation don't come through in the written form of the language - I hope this is coming through as positive suggestions. :))

David Selby

Mr Strager,

I'm a recently retired ZX-81 user and happened to stumble onto the T/S2000 site. I noticed you have a page ZQR QLive Alive!

with many items for sale at very reasonable prices.

When should I contact about purchasing some of these items?

Also please forward T/S2000 membership information as I wish to support groups such as yours who keep the Sinclair line of computers alive. Regards,

Glen Goodwin

Hi Abid,

Here's another news article I found on the 'net about the next Sinclair machine:

Jack Bourne-right

Linux Tempts Sinclair Back Investor Promises to Undercut PC Market With Linux Machine.

Inventor and entrepreneur Sir Clive Sinclair is planning a return to the IT market with a low-price portable machine based on Linux and non-Intel chips, writes Robert James Blincoe.

Sinclair believes the product will receive support from the corporate and academic markets because Linux has already secured great loyalty in those sectors.

He claims his proposed machine, which will take two years to come to market, will be built around a cheaper processor than Intel's.

"The standard PC is expensive because of Intel and the software, which is demanding of memory," Sinclair said. "The reason why my machine will be cheaper is that it will use a lot less memory, a lower-cost processor, a simpler power supply and a lower-cost operating system."

Sinclair says his new machine will be released at less than half the price of other similar-sized PCs on the market. He supports the loyal Linux users who want Windows to be unfettered from PCs.

"There should be one price for a machine with Microsoft and one price for a machine with Linux," he said.

"Linux looks like a way in - a Trojan horse," Sinclair continued, "a lot of software suppliers are now supporting it. They wouldn't do that if they didn't have a lot of confidence in it. I think a dedicated Linux machine will be the next step."

31 April 1999, Business Publications Ltd.

Dear Abid,

Peter Liebert-Walt purchased some T/S magazines from me and because a couple of CTM magazines were in those that I sent Peter what if I could give him any "fill in" about them? Apparently they were devoted to computers and radios? I know nothing about the mag. I wondered if you (or perhaps, one of your readers) might be able to help Peter? Sincerely,

Frank Hone

Dear Abid,

I recently email-noted you a memo requesting a copy of ZQR 3.0. I did get a copy and thank you for your help.

As you can see, I have finally made the jump to the

pc - windows system.

And as you can imagine I have far too many test files to consider printing and then re entering them into the windows format.

The question then is, is there a dos/windows utility that will allow a p.c. to read TS2068 LaRkan test files?

I do not plan to sell the TS2068, but for the sake of convenience would like to be able to read the LaRkan datasets with the p.c. Thank You

Don O'Brien e d ocratt@worldnet at net

As far as I know, the only way to read TS2068 files is a PC or through a modem, if you have a TS2068 modem that is

One way is to UPLOAD a file from the 2068 to a BBS for instance and then DOWNLOAD that file by a PC.

Or connect the PC and the 2068 modems together and have one computer UPLOAD or DOWNLOAD to the other computer. A little tricky but I have done it in the past. But I will steer you to Robert Swager (Chicago Area Times User Group) robbsw@net.com

I also have some software tools for TS2068 that I have gotten in recent purchases. Profile 2068, Tapedrive 2 and some others. If you want a list I will try to get it before the next release. I also have TS1068 cartridges, Causleys and Steve Capitals.

Jack Beardslight

Date: Thu, 7 Jun 1999 12:18:18 -0400 (EDT)
From: jbr11@chicland.rr.com (Red Goven)
Subject: Thanks for DQA!
Hello Alvin,

Well, I am finally able to do email. I cannot send or receive attachments, but I can use the mail. I received the disk last week with the VO file on it. I must say that it was in sorry condition. The metal disk cover was so bad that I had to remove it once to get it into a drive. I did manage to get it ok, load the file and then I threw it away. Thank you for the file.

Now, however, you can put whatever you have in or can put into ASCII text format and send it to me as an email letter. It will save a lot of trouble on your part.

Jack Beardslight has been keeping me up to date with now. Now I am able to get on his site and jump to other TS pages from there. It is interesting. I do not use windows to do this. I am using a DOS program called Comore V7 and my local library has a Telnet connection to the internet. I can go anywhere and even download files, I just cannot attach things to the mail I said. That is not of the requirements of the freenet concept.

Well, I will quit for now. Hope to hear from you when the new DQA is ready. Later,

Red Goven

To: Bob Swager Larry Sauter
Cy Hierre John Donaldson
and Phillip Kiwukowski

Thank you very much for the flowers sent to my wife's funeral.

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McKibben, William	mckibben@netnet.net


```

10 GOS
20 PRINT "British pound £ to US $
conversion"
30 INPUT "Enter current $s.pound to £
rate: " R%:p
40 INPUT "Currency in £s to convert:
L" :p
50 PRINT "£100 dollars= "L/R%:p

```

```

PRINT USING"#####.##",pr:op
60 PRINT "\\Any key to repeat - CTRL
SPACE to halt\\"then RUN to change RATE"
70 GOTO 1000
80 GOS
90 PRINT "Current $ to £ rate: R%:p
100 GO TO 40

```

FROM THE CHAIRMAN'S DISK II

Donald S. Lambert

Under the column Article Contributions on page 2 there is a box in which it states that "Send us your articles by tape or disk and your inputs to me" that has to be changed. Sometime between the November, Summer '89 and Fall '89, I will be down to one computer and that will be a 286. By then I will have sent all my other computer equipment to Jack Boardwright. I don't really want to put with my 2068 (BUT) weekly pressure and a stress in forcing the issue. With that said I will continue with this column.

Why my back when I bought a 286 EPROM Eraser that requires an AC voltage of 220 volts. Someone responded with the information that a supplier had a 110 VAC to 220 VAC plug in transformer so I ordered it and it is a nice little thing. But before I got the transformer I had bought a power supply that had the ability to convert 110 VAC to 220 VAC. So I had converted it so that it supplied 220 VAC. But that thing was a heavy and big deal. While it is not according to electrical code, I had on the 220 VAC to a standard type 110 VAC socket and put a standard 110 VAC plug on the line cord of the 286 EPROM Eraser. Today as I was cleaning and noting things I came across the EPROM Eraser and I dug out the snap up transformer. I stared at the socket on the transformer and I noted that it was for a round U.K. type plug prongs. BUT then I noted that it had also the provision for the flat plugs like on the US 110 VAC has cords. Yep it fits I presume it works since I did not test it.

I thought that a 2068 on the other computer desk had gotten contrary but today while copying a 3.5 720K disk to DSD 348K disk I discovered that drive 0 (full height 348K) drive must be had since drive 1 (half height 348K) drive worked all right. That 2068 will be in the next box of TS problems that I will ship to Jack I have a full box to send out as soon as I send it up, put the shipping label on and take it to UPS for shipment.

Now the "news" we have bought a house in Forsyth, IL. And when is Forsyth IL? I you take I-72 into Decatur, IL and just going south you are in Decatur but if you exit going north you are in Forsyth. Decatur is not growing and housing is rather limited I think there are new houses but not located where it is easy to get to the shopping. BUT the only enclosed mall and a lot of the stores for the area are in Forsyth. They are building all over in Forsyth. Our oldest daughter and family live in Decatur and are about 7 miles from where we are buying. There are grandchildren there and the youngest is in 7th grade going into 8th next year. Looking back we have owned about 10 years in a house since we started buying houses.

We went to Decatur to see the grandchildren in show school of the intermediate school. It was a long performance since they put on all their competition stuff.

We will be going back Memorial day weekend to attend the grandson's high school graduation party and also to meet with the builder on the lot of land (our wedding anniversary, 40th) to pick out the flooring and such for the house. We picked out the siding color and bank work and exterior paint on May 4th and the interior cabinets May 14th. How did we find the house? Well, we were there the week end of April 23rd and we arrived early so we went driving around Forsyth and spotted that house with workers working on the roof putting on the sheathing. They seemed as to take a look at the rough framing of the house and they gave us a set of blue prints. We sort of drifted along till I put the pressure on for my wife to make up her mind. So when I called on May 4th on talk to the builder we found that the house was quite a few thousand less than we had been quoted at a possible price by the workers.

The builder's brother was in another city 45 miles away talking to a prospective buyer and since the financing was too iffy for that party we had a verbal agreement to buy the house. After we had gotten the house on the evening of the 4th of May so I was relaxing they showed the terrible damage in Oklahoma. Yes! we will have a basement! I looked on the map and Old Parrish is not too far east of that area I don't think to get my damage.

I realize that this is not too much about Thing but it will explain my lack of input and my address change. I have an address but I will hold that off to reconfirm it and find out more about the move with a tentative date of August 1st this year. Right now we are in the process of getting the house here ready to sell and packing, sorting and disposing of extra stuff or no longer wanted stuff.

I am about 310 miles one way and it seems longer especially with I-74 having a lot of construction west of Indianapolis to the IL border. 60

The armed attack on that high school would not have happened if the gunmen attacked the classroom all the other kids could have down their pockets at production the NRI's message. This just transforms the NRI's message that none of us are afraid everybody and that includes every single child is adequately armed.

Font Loader in HiSOFT Pascal®

Article and Program by David Kelly

One of the attractions of the Times/Starline 2668 is its ability to change its screen font through the use of user-defined fonts. As a programmer, you may want to change the display font a program uses for several reasons. A banking or financial program, for instance, would require that you use a font in which no one can possibly mistake a letter like "d" for the number one. To better set the mood of a game set in the Middle Ages, you may wish to use a Gothic font. Likewise, a game set in outer space may require a futuristic looking font. Perhaps you want your T/S 2668 to display text in Greek or Russian. In that case, you have to change the entire character set as well as the font. (To the confusion of many, computer programmers and technical writers tend to use "font" to mean either a "font" or a "character set". Be aware that the program I am about to describe can be used to change both.)

Font loading and activation is much easier in HiSoft Pascal, (now called Pascal), than in BASIC for the following reasons:

Firstly, you don't have to make any changes to RAM_TOP. To prevent BASIC programs from overwriting a user defined font, the usual practice is to lower RAM_TOP and load the font into the protected area created above. In Pascal, a global array *f* which is also a static array *f* is used to reserve space in RAM into which the font is loaded. Pascal keeps track of such arrays and prevents them from being overwritten by any of its operations.

Secondly, you don't have to worry about where in RAM the font file is loaded. The routine function ADDR(*x*) can be used anywhere in a program to locate the start position of any variable the program uses. Even if you should make modifications to your source code which changes the location of a given variable within the compiled program, ADDR(*x*) will still be able to locate it.

Finally, you are relieved of doing and re-doing the calculations needed to determine which values to poke into the system variable CHARS to activate the new font. Once ADDR(*x*) has been used to locate the start of the variable being used to store the font, all your program is required to do is to invoke the POKB(*x*, *y*) procedure to transfer the value less 256 bytes to CHARS, then POKB(CHARS, ADDR(*x*)-256), and your new font becomes active.

There are already font activation programs already written in BASIC. Most of these save the fonts they create as a byte file of 170 bytes. Below is a demonstration program written in Pascal that contains source code which will allow you to load and activate these fonts within a Pascal program.

```
PROGRAM FONTLOADER,
```

```
Special note to HiSoft Pascal 1.7M users:
```

```
This program must be compiled in 31 column mode.
```

```
CONST
  Chars = 2560;
  {Chars holds the address of the
  system
  variable CHARS which in turn points
  to
  the location either in ROM or RAM
  where
  the current font is located.
  The value stored in CHARS is always
  256
  bytes less than the actual start
  location of the current font.}
VAR
  CharSet : ARRAY [0..170] OF CHAR;
  {Reserve space in RAM for the new
  character set}
  {Remember: CHARS takes 1 byte,
  INTERIOR takes 2 bytes}
  FileName : ARRAY [1..12] OF CHAR;
  {An array for holding the file
  name of the font to be loaded}
  StartAddr, %to hold the start address
  of the new font
  I : {A loop counter}
  ; INTERIOR;
```

```
BEGIN {MAIN PROGRAM}
  PAGE; {Clear the screen}
  WRITELN('What is the name?');
  WRITELN('of the font to load?');
  WRITELN('12 characters padded');
  WRITELN;
  WRITE(' ');
  READLN; {Required in ES Pascal}
  READ(FileName);
  {Load in the font}
  TIN(FileName, ADDR(CharSet));
  StartAddr := ADDR(CharSet);
  {Poke location of new font
  into the system variable CHARS}
  POKB(Chars, StartAddr - 256);
  {Print the new font from space to
  END-OF}
  FOR I := 32 TO 164 DO
  BEGIN
    WRITE(CHR(I), ' ');
  END;

  WRITELN; WRITELN;
  {Add font save code here if required}
  WRITELN('End of test');
  END;
```

A special note for ZX Microdrive users:

For some reason the Pascal font loader will only load fonts that have been saved on tape. Trying to load font file which has been saved to the Microdrive from BASIC will

generates an "invalid file format" error report. If you wish to use the Microdrive to load in a new font, you can, but first you must create a special kind of font file from within a Pascal program for each font and save it on the Microdrive.

First, add the following lines to the source code in the app indicated in the next program and compile. Then recompile and save the new font loader/saver program.

{Save font routine}

```
WRITELN('Enter a name to save');
WRITELN('the font to the
macrodrive?');
WRITELN(' (12 characters padded)');
WRITELN;
WRITE(' ');
READLN; {Required in MS Pascal}
REAR(Filename);
```

{Save the font}

```
DOOT(Filename, ADDR(CharSet),
SIZE(CharSet));
```

Next, if you do not have your character sets saved on tape already then using BASIC you will have to load in each font from the Microdrive in and save it on tape (I trust that you will know how to do this).

Once you have your font files saved on tape then you can use the Pascal font loader/saver program to load them back from tape and save them out to a hard disk. I would strongly suggest using a new cartridge for the Microdrive. Now your character sets are ready for use any time you wish to use them in a Pascal program.

The source code for this program is available upon request by sending e-mail to David Nelly at nd333@net.ca. Source code is saved in an "MEX" file which is compatible with Gordon Lunter's EXE EXE Spectrum emulator.

West Coast Sinclair Show

By Tim Swanson, the show organizer

The West Coast Sinclair Show was held in Union City, CA, on 5 June 1990, one week after the East Coast Sinclair Show. Most of the European attendees arrived the Monday before the show and spent the week visiting San Francisco.

The day before the show was by Star-B-Q at my house. Before the show a trip was made to a local regional park to share the Pomona's little bit of California nature. Luckily the sole trip was enjoyed by all.

The attendees at the Star-B-Q were: Simon Goodwin and his girlfriend Carol Lynn, Tony Furman, Ray Wood, Johnnie Mera, Marcel Kilgas, Patrick and Inge Breder, Ben Perkins, Don Williams, John Kule and Rick Butterright. An amazing 14th, Simon, Glenn, Tony, Marcel, and I dined at the Star Pub for a bit of a rest.

The day of the show I loaded up the station wagon QL stuff, packed up a few folks at the local Motel and headed for the venue.

As this was the first show I've organized, I was not too sure on how big a place to get. The venue is, shall we say, nice and easy. There was enough room for the vendors, but not really enough for a lot of walking space.

The vendors were: Tony Furman with his over priced QL controlled L800 robot, Ray Wood showing software on a C64, Johnnie Mera and Marcel showing a table with their wares, Jack Butterright was selling the best of the stuff from RMC, John Kule the sole US QL, Z88 dealer had mostly Z88 stuff on his table. Don Williams had a Spectrum Z88 set up for all to see. Simon Goodwin looking on a QL (one of two) that had been given to

BEATING THE HIGH PRICE OF

PRINTER INK

Editor

If you got a good deal on that ink-jet printer only to find out later that the cost of buying new cartridges is breaking the bank. Each cartridge costing between \$18 to \$3.34 and producing at most 300 pages. It is easy to spend more on ink during your first year of ownership than you paid for the printer itself. Suddenly that \$599.99 - \$3,340.00 color ink jet doesn't look like such a great bargain.

You can slash the ink cost radically by purchasing refill kits from various suppliers who sell these kits for various inkjet (bubble-jet) printers like Canon, Epson, HP, Lexmark etc. for around \$12 per ink bottle that is good for 14 refills in my case.

My kit included 4 oz. of ink, a syringe and a little hand drill with gearcase. You poke a hole in the cartridge with the little drill, then using the syringe, you inject the water soluble ink into the cartridge - doing that over the sink or a newspaper - just to coast! It is almost like getting ink for free.

Well, you are back in business for a fraction of a penny per page. No-Kate Inspirations, 800 468-1422, www.nokate.com, Renewable Resources, 800 734-6448, www.renewablresources.com, Repeat-O-Type, 800 228-3333, www.repeatotype.com.

explains looking for a new home, by a QLer who had upgraded to Mac.

Ken Harsh drove from Fresno to pick up some TIS 2068 stuff and went home with one of the upgraded QLs. Bill Miller and Tony Granitz (formerly of the Prometeia QL Group) made a surprise visit to the show.

The key visitor to the show was the renowned author Sir Kelly-Islands, winner of many computer books, including the "Civiel's QP Dictionary" and the holder of the first post-graduate degree in Computer Science (from Oxford).

Simon Goodwin has been a reader of Star's work for a number of years; he lives in Scotland and considers this one of the few that have really mastered the English language. When I mentioned to Simon that Star was coming in the show, Simon's jaw literally dropped. Simon got to spend a few hours chatting with Star, making the whole issue.

There was no unrecorded demonstration or talks, just a whole lot of Sinclair talk going on. Since I was the organizer I was not really relaxed enough to truly enjoy the show.

When the show ended at 5:00 there was a debate on where to have dinner held. Originally, Tony and Ray were leaving for the Airport right after the show. Unknown to me, their flight was delayed 4 hours and they had time for dinner after the show. Luckily everyone agreed on a place for dinner and the restaurant easily handled a group of 13.

We are talking about plans for next year. We have just discovered a local "Vintage Computer Show" that would be the right medium to advertise our show. Hopefully we can generate more local attention next year.

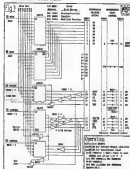


Improved TS-2068 Internal ROM Bypass I

By the late William Pedersen, WEDX/P

A major barrier to fixing the problems in INTERNAL ROM is one of access. Even though the ROM is isolated you still have to open the case. This risks damage, and even then, replacing ROM with EPROM requires wiring modifications. This article shows how to replace HOME ROM and EXOROM without touching a screw.

It is not necessary to replace ROM with EPROM. Battery backed up static RAM will do as well if equipped with a READ ONLY switch. That way the RAM can be written and then switched over to write-protect state. The saving in time over burning EPROM is impressive, however, you will probably elect to use EPROM once concerns have been made.



When expansion banks are connected, they assume priority by driving the BE (Bus Enable) signal low (using open collector gates). This is applied to the bus master and control by the SCLD, which then shuts down all LOCAL memory (except for display memory while it is using it). It includes ROMCS, EXOROM and ROMCS signals which enable DOCK (cartridge), EXOROM and HOME ROM (memory chips) respectively. DOCK and EXOROM are not type expansion banks in that sense that they have lower priority than external BANK #0 and #254. The "missing" three banks in TIMEX documentation are now readily missing at all. The micro-coded BEU would have contained a new operating system using them.

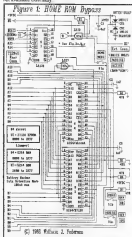
The design presented here has very carefully retained the ability to attach a non-TIMEX SBU with expansion slots—or any other system your heart might desire.

Many users will not initially have a back-plane with

expansion slots. The preferred location for ROM bypass would seem to be the cartridge slot, however, locating it there disabled a bug which involved BE signal conflict on rare occasions.

Home ROM Bypass

Home ROM is enabled by the SCLD using a signal named ROMCS. Unlike EXOROM and ROMCS, this signal is not available externally.



Our task is to disable Home ROM, and then enable an external equivalent.

The first is easy. Any time HOME ROM is being addressed bus signal BE can be driven low. This suppresses ROMCS.

The second is a bit more complicated, but not difficult. HOME ROM is addressed whenever NOTHING ELSE is in process of addressing.

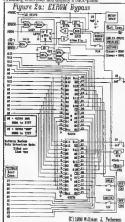
1. A14 or A15 is high (CHUNKS 2 thru 7 addressed).
2. EXOROM is low (EXOROM addressed).

- 2 RDSCS is low (ROCK bank addressing).
 - 4 MRDQ is high (NOP, IO or INTERRUPT CYCLE).
 - 5 BE is low (Expenses bank active).
 - 6 RD is high (Write cycle in process) or
 - 7 RPSH is low (Applies to some static RAM)
- What logic could be easier to implement?

Before attempting operating system revision, a copy of existing code can be used in the bypass. This is an excellent test of bypass circuitry. No change in operation should be detectable when a bypass card is present, or absent.

EXROM Replacement

EXROM presents an interesting problem. It is enabled by the EXROM signal (not BANK #254), but lack of complete internal address decoding results in false images occurring in all other banks, not just CHUNK 80. If we had an expensive BANK #254, it would have higher priority than the internal chip - but that requires a bank switching controller and possibly a back-plane.

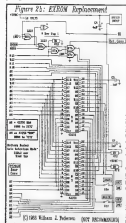


The simple solution is to physically remove the EXROM chip from inside and reconnect it with full address decoding on a board. Though it is necessary to open the case, no wiring changes are needed and the chip can always be put back.

A tremendous advantage is gained when this is done

The false images are gone, making seven CHUNKS of EXROM available for use as either RAM or EPROM as desired! Again, this can be tested for no change in operation before and after the change.

Figure 2b is a practical variant of this which allows updating.



EXROM Bypass

Lacking a bank switching controller, it would seem impossible to use the BE signal to disable the internal EXROM chip and still have an external bypass take over. The presence of the EXROM signal from the SCLD would try to disable itself, resulting in oscillation.

If the actual presence of EXROM signal can be locked on the bypass board, and then BE is switched low, this can be avoided.

Now we have a way to leave these screens unattached.

We need to reset the brick before the next instruction comes along, when an external bank wants priority, at power-up and RUPRESH.

The extra cost of a safe approach might make the risk in removing the EXROM chip seem worth while. That is what Figure 2b is for.

This is **not** recommended unless you are a confirmed hacker!

How to Hack on The 2N Spectrum *Let Control*

Part 6 - cont.

```
CC94 3E C3 LD A, #C3
CC96 38 32 00 LD (#5000), A
CC99 21 A3 0C LD HL, CC91
CC9A 29 33 00 LD (#5030), HL
CC9C 03 00 38 JP #5038
```

The puts the instruction (P #CCA) at #5032 so the loader decrypter will return to our back at #CCA when finished

```
CCA1 21 B2 0C LD HL, #CC91
CCA4 11 25 58 LD DE, #5B25
CCA7 01 08 00 LD BC, #0008
CCA9 8D 00 LDH
```

This copies the final part of our loading routine to #5B25, where it will be executed once the whole game has been loaded

```
CCBC 21 00 00 LD HL, #0000
CCBF C3 38 00 JP #5B35
```

The LD HL, #0000 instruction is important, because it's the instruction we connect with our LD back to the back. Therefore, we're got to associate it, otherwise the loading system may crash. Then it resumes loading at #5B35 with the PCCA finally in place

```
CCB2 3E 04 LD A, #04
CCB4 32 37 8D LD (#5B8F), A
CCB7 C3 0C F5 JP #F5BC
```

This is the loading routine which will be copied into the loading system. ADF,HL is the POKE for infinite loop (which can be worked out by a forwards or a backwards loop), and JP #F5BC jumps to the game

And that's about it for (Spectrum) Hopefully, if you were hacking a different game, you still managed to do it (they're all virtually identical anyway)

ULTIMATE LOADER

Remember Ultimate? They were one of the first software houses of all time. Most of their games from 1983 to 1987 had the same type of loader (but a few were Specialised - more about that later). On the face of it, it just looks like a totally unimpressive BASIC loader, but the appearance is deceptive. The file loader it loads are the loading screen, the game itself, a decrypter at #5B60, and two very short blocks of system variables. The system variables are, in actual fact the BASIC clock, and determine how many slots of a record the computer has been rented on for. The decrypter works using this system variable. The upshot of all this is that if you stop the program for even UNK of a second, you'll mess up the decrypter. You can get round this with a Multiface by loading in the first three blocks of code, then replacing the code at #5B50 with #F1F1B and #F1C. This disables interrupts, so the system variable doesn't get updated, and creates an infinite loop. Load in the last two blocks, overwrite the Multiface, and find out what the system variable should be. Then you can put this into the decrypter automatically

MIKRO-GEN LOADER

This loading system appeared as just about every game released by the software house Mikro-Gen (oddly enough) from about mid-84 to their demise in 1987. They came in two variants, and you'll need a Multiface to load

some of the later ones, unfortunately

The first type are recognized by black and white loading stripes, which loads in a screen block, and then the main game block separately. It's loading Pysarcasm as an example, but any Mikro-Gen game which fits the above description will do

So the first thing to do is to 'Hack the BASIC loader

```
PYBASICSCREEN, LINE 0: LD 204
0: BOUND 7: BOUND 7: BOUND 0: BRIGHT
0: PFLASH 0: GAB: PRINT AC
12, 12: "LOADING" (BOUND(22) USR (POKE
23421+254*POKE 25621+6)
30: POKE 23754, 0: POKE 31717, 0: SAVE
"PYBASICSCREEN" LINE 0: BOUND(22)
USR 23048
```

The BASIC loader actually does more than what we can see. If you're old enough to remember the ZX-81, you'll recall that the best place to put a machine code program is in a REM statement. And that's almost the case here, except the machine code comes after the ASCII code #0B (NEWLINE) so you can't list it (but it's there). It's covered by the BOUND(22) USR command. Type PRINT (POKE 23421+254*POKE 25621+6) and you'll find out the start address of the code I made at 23754, which is #5B50 (as you might find it to be something different, so disassemble this address

```
5B50 F3 31 LD SP, #0000
5B52 2A 48 0C LD HL, (#5C08)
5B55 11 1C 00 LD DE, #001C
5B58 19 ADD HL, DE
5B5B 11 16 00 LD HL, #0116
5B5E 01 07 00 LD BC, #0007
5B61 ED 04 LDH
5B63 C3 14 00 JP #0116
```

Hopefully the DE and the LD SP, #0000 should be familiar

The new line loads HL with the two byte value starting at 5C08. I made it 2BAA. This line has 1C added onto it, making it 5B5B. The rest of the code is a simple LDH command, which puts the loading system to where it should be

In our hack, we've simply use a barebones loader to load the code into place. We know that 5B50 goes to 4008. BASIC always starts at the value in #5C51, which is #5B50 in this case. We know that the length is 1600, or #F1F1B less bytes long, and the start address is (#5C51-#F1C5)+#01B = #F1F1B. So, run the following routine

```
5B00 00 21 18 7F LD IX, #F1F1B
5B04 11 F8 01 LD DE, #01F8
5B07 3E FF LD A, #FF
5B09 37 SCF
5B0B 0D 54 05 CML #0054
5B0D 90 F1 JR NC, #5B44
5B0F C9 RET
```

I've put a JR NC, #5B44 in, so that the computer ignores the BASIC loader, and will only return on loading the main BASIC block. You should also note, that in the final hack, we'll have to add a DE and a LD SP, #0000 sometime. For now, disassemble #5B18

```
#5B18 0D 21 00 48 LD IX, #4000
```

```
#001A 11 01 18 LD HL, #0001
```

```
#001D CD 4F 80 CALL #004F
```

This code activates the turbocharger, which loads in the title screen.

```
#0020 21 80 40 LD HL, #0000
```

```
#0023 01 80 18 LD BC, #1800
```

```
#0026 CD 1F 80 CALL #003F
```

This code verifies that the screen has loaded in properly (the routine at #003F adds up all the memory with start HL and length BC), and compares it with the tape after this block), and resets the computer if it hasn't.

```
#0029 00 21 40 82 LD LR, #0001
```

```
#002D 11 80 7A LD HL, #7A00
```

```
#0030 CD 4F 81 CALL #004F
```

```
#0033 01 80 82 LD HL, #0000
```

```
#0036 01 80 7A LD BC, #7A00
```

```
#0039 CD 3F 80 CALL #003F
```

This is exactly the same as with the previous code, except it loads and checks the main game instead of the loading screen.

```
#003C C3 88 FC JP #FC00
```

Put a breakpoint over the instruction. Now POWER #0012 with F3, #0013 with 801, #0014 with #00 and #0015 with #00 (because we didn't associate the DI LD SP, #0000 from the BASIC loader, and the game will not load otherwise), JP #0012 and start the tape. When the main game's loaded, disassemble #FC00.

```
#FC03 23 8F 84 LD HL, #F88F
```

```
#FC06 11 00 40 LD BC, #4000
```

```
#FC07 80 00 18 LD BC, #1800
```

```
#FC09 1A LD A, (DE)
```

```
#FC0A 3A SCR DEL
```

```
#FC04 77 LD (HL), A
```

```
#FC05 23 INC HL
```

```
#FC06 13 DEC DE
```

```
#FC07 08 DEC BC
```

```
#FC08 70 LD A, 0
```

```
#FC09 01 OR C
```

```
#FC0B 20 F6 JR NZ, #FC0E
```

```
#FC0C C3 EA 8C JP #00EA
```

The decrypter uses values in the screen memory, so you'll have to put a breakpoint at #FC0C, put a JP #FC09 at #0026, JP to #0012 and reload the loading screen before you can run it. Then disassemble #00EA.

```
#00EA 31 00 80 LD SP, #0000
```

```
#00ED CD CC 8E CALL #00CC
```

```
#00F0 C3 00 82 JP #0200
```

This code puts the stack pointer back at #0000, CALLs another decrypter, and JP's to #000E, which is the start of the game. Change the #0000 to a suitable place to put POWER, flash them with a JP #0020 to start the game (that's the final hack, and I've put it at #00ED, because it doesn't get overwritten, apart from the byte at #0080 itself, which is no longer needed by this time. Also, I've corrected the DI LD SP, #0000 directly, as well as the code from #00EA to #00F0.

```
#00E0 00 21 18 7F LD IX, #7F18
```

```
#00E4 11 F0 01 LD BC, #01F0
```

```
#00E7 06 F7 LD A, #FF
```

```
#00E9 07 8CF SCF
```

```
#00EA CD 56 03 CALL #0056
```

```
#00ED 00 F1 JR NC, #0000
```

```
#00EF 21 3C 5A LD HL, #5A1C
```

```
#00F2 22 3D 80 LD (#000D), HL
```

```
#00F5 F3 00
```

```
#00F6 31 00 00 LD SP, #0000
```

```
#00F9 C3 14 40 JP #001E
```

```
#00FC 23 78 00 LD HL, #5A00
```

```
#00FF 22 90 FC LD BC, #FC90, HL
```

```
#00A2 C3 88 FC JP #FC00
```

```
#00A5 31 00 00 LD SP, #0000
```

```
#00A8 CD 00 80 CALL #00CC
```

```
#00AB AF 00A, A
```

```
#00AC 32 77 7F LD (FFFF), A
```

```
#00AF C3 00 80 JP #0000
```

The other type of Mikro GEM loader is almost identical, except the whole game loads in one long block.

Then end of the BASIC loading system is missing in most versions, and is only loaded right at the end of the main bootstrap block. You can find out the missing code by loading the game as normal, then stopping it with a Modificator at the pause between the game loading, and the game starting (approx. 3 seconds), and look it in the same way as Pipeworks.

POWERLOAD

The protection system appeared first around the start of 1984, and was written by "Tag" (Phil Tagwood) for Incentive Software. However, it's been used by quite a lot of other software companies as well, including Beyond, Microball, Prime and Amulet. It can be recognized by the screen turning black, accompanied by a few wounding beeps. It then loads one short bootstrap block, and then a longer bootstrap block, which includes the address file for the game coming up "backwards" i.e. right to left, starting from the bottom. The game also stops loading just before the end of the long bootstrap block.

The only thing I know of that VS have put on the coverpage that has Powerload is the Graphic Adventure Creator, but that's pointless loading, so named F3 to loading Dynamic Duo. Of course, most other Powerload games are identical apart from some addresses, and, in fact, the BASIC loaders are all identical.

Before we start, I need to explain a little more about the stack, because Powerload uses it a lot. There are four commands which use the stack, and they are:

PUSH X (where X is any register) this takes the value in a register, and puts it onto the stack. The stack pointer then decreases by two (to be in the right place to access another value).

POP X

this takes the two byte value at the stack pointer (i.e. the top of the stack), and puts them in a register. This also increases the stack pointer by two.

CALL XXX

when you CALL a subroutine, the return address (i.e. the address after the call) is PUSHed onto the stack, and the subroutines is Jmp'd to. The stack pointer also decreases by two.

RET

when a RET instruction occurs, the computer takes the value at the top of the stack, and JP's to it. The stack pointer increases by two.

Now we've cleared that up, let's start loading. "Hack the BASIC as usual."

```
D 01 138E 0 138E 494
```

```
0 ROM
```

```

10 CLAMP $R0000;P0R0 23680,0;P0R0
23680,0;P0R0 23697,0;CLAMP;P0R0
23698,0;P0R0 $R=30 TO 30;BEEP
,070,0;BEEP 0;BEEP;P0R0 0
24140;BEEP;P0R0 0
100 P0R0

```

The P0R0s in line 80 just make the screen black and prevent you from pressing keys. 24140 is #5252 here, but a breakpoint at #5252 and QUIT 0. This is because the stack is set up in a specific way by the BASIC commands

```

5252 P3 BC
5253 21 00 00 LD HL, #5000
5254 39 ADD HL, SP
5257 22 P3 50 LD (#5002), HL

```

This code simply puts the value of the stack pointer into address #5002, so it can be retrieved later

```

5258 31 80 5E LD SP, #5050
525D 34 8E LD B, 50H
525F 00 PUSH HL
5260 31 48 5E LD HL, #5060
5263 09 JP (HL)
5266 1E 13 LD A, #12
526A 32 93 53 LD (#5060), A
526D 01 POP HL
526E 00 PUSH HL
5270 04 POP DE
5270 C9 RET

```

Put a breakpoint at 5270 and JP to 5252. At 5270, the value on the top of the stack is #5050, so a RET will JP to there

```

5274 C1 POP BC
5277 7E LD A, (HL)
5278 8D 44 NEG
527A 77 LD (HL), A
527B 23 INC HL
527C 10 P3 DNEG #5c77

```

This code is, as you might realize, a decryptor. The start value of HL is #5B12, and the initial value of B is 43A. In case you've missed, the NEG instruction turns the value in the A register into its negative form, in other words, the value in A is subtracted from #000 here. Put a breakpoint at #5B7E and JP #5B70 which is where we left off

```

5B7E 01 POP HL
5B7F 33 78 5E LD A, (#5B70), HL
5B82 C1 POP BC
5B83 3E 09 LD A, 09H
5B85 32 7E 5E LD (#5B7E), A
5B88 3E 08 LD A, 00H
5B8A 32 7A 5E LD (#5B7A), A
5B8D 00 PUSH DE
5B8E 01 POP HL
5B8F C9 RET

```

This code changes the previous decryptor slightly, and RETs to 5B77. Put a breakpoint at 5B8F and JP #5B7E

```

5B77 7E LD A, (HL)
5B78 8D 47 NEG
5B7A 30 NEG
5B7B 23 INC HL
5B7C 10 P3 DNEG, #5E77
5B7E C9 RET

```

This code works with the same values as the previous one, HL=5B12 and B=1A. In this RETs to 5B12. Put a breakpoint at #5B7E, and JP #5B8F (where we left off last time)

```

5B12 31 84 5F LD HL, #5B04
5B15 11 00 5F LD DL, #5B06
5B18 08 08 00 LD DL, #5B08
5B1B 0D 00 LDH
5B1D 01 POP HL
5B1E 34 LD B, 0
5B1F 50 LD B, 1
5B20 10 DNG B
5B21 C1 POP BC
5B22 0D 00 LDH

```

These two LDH commands wipe all the memory that isn't being used by the loading system. To get around this, you should change #5B18, #5B1C, #5B22 and #5B23 to #00, to stop them being executed. Put a breakpoint at #5B24 and JP #5B7E (where we left off)

```

5B24 04 1E LD B, #1E
5B26 01 POP HL
5B27 7E LD A, (HL)
5B28 8E A3 NEG, #A3
5B2A 77 LD (HL), A
5B2B 23 INC HL
5B2C 10 P3 DNEG, #5C77

```

The value in HL for this decryptor is #5B2E, which is right after the decryptor. To check it, therefore, move the code from #5B24 to #5B2D somewhere else (such as #5B00), put a breakpoint on the end, and run the code from there. When that's done, put a breakpoint at #5B2E and JP to #5B2E (so that you're back in the right place in the loading system)

Carrying on with the loader

```

5B2E 01 POP HL
5B2F 22 02 5E LD (#5B00), HL
5B30 01 POP HL
5B31 22 03 5E LD (#5B05), HL
5B34 37 INC
5B37 3E 07 LD A, 00H
5B39 CD 00 5E CALL #5B00

```

This code takes some values off the stack, and puts them into the subroutines at #5B00, which is then CALLED. Put a breakpoint at #5B39 and JP to #5B3E

```

5B39 0D 21 40 9C LD IX, #5C40
5B3A 11 80 1 LD DL, #5B80
5B3F 14 INC D
5B3B 08 EX AF, AF
5B39 15 DNG D
5B3A 3E 0F LD A, 0FH
5B3C 0A P8 OUT (P8), A
5B3E CD 40 85 CALL #5B00
5B41 C9 RET

```

The routine is a headless loader. The start is #5C40 and the length is #190. Also the value of A is F, and the carry flag has been set. In effect, we would have used a standard CALL #5B3A headless loader. Put a breakpoint at #5B3C and JP to #5B39. Start the tape and load in the first short headless block. Then continue downloading

```

5B3C 08 01 00 JP #5C40

```

This code resets the computer if there was a loading error from the first headless block

```

5B3F 20 40 9C LD HL, #5C40
5B40 08 0F LD B, 0FH
5B42 CD 77 5E CALL #5B7F
5B47 06 0F LD B, 0FH
5B49 CD 77 5E CALL #5B77 (to be continued)

```

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